SCIENCE FRAMEWORK
As adopted by the State Board of Education
February 6, 2002

On February 6, 2002, the State Board of Education adopted the Science Framework subject to a technical editing process to be conducted under the supervision of Robert J. Abernethy, the State Board's science liaison. The technical editing process is underway and has resulted in some relatively minor changes to improve clarity and accuracy. Although this technical editing process is continuing, it is not expected to result in major changes to the document from the form in which it appears on this Web site. Therefore, from this point, we plan to update the Web-site-based document only when the technical editing process has been completed.

March 18, 2002

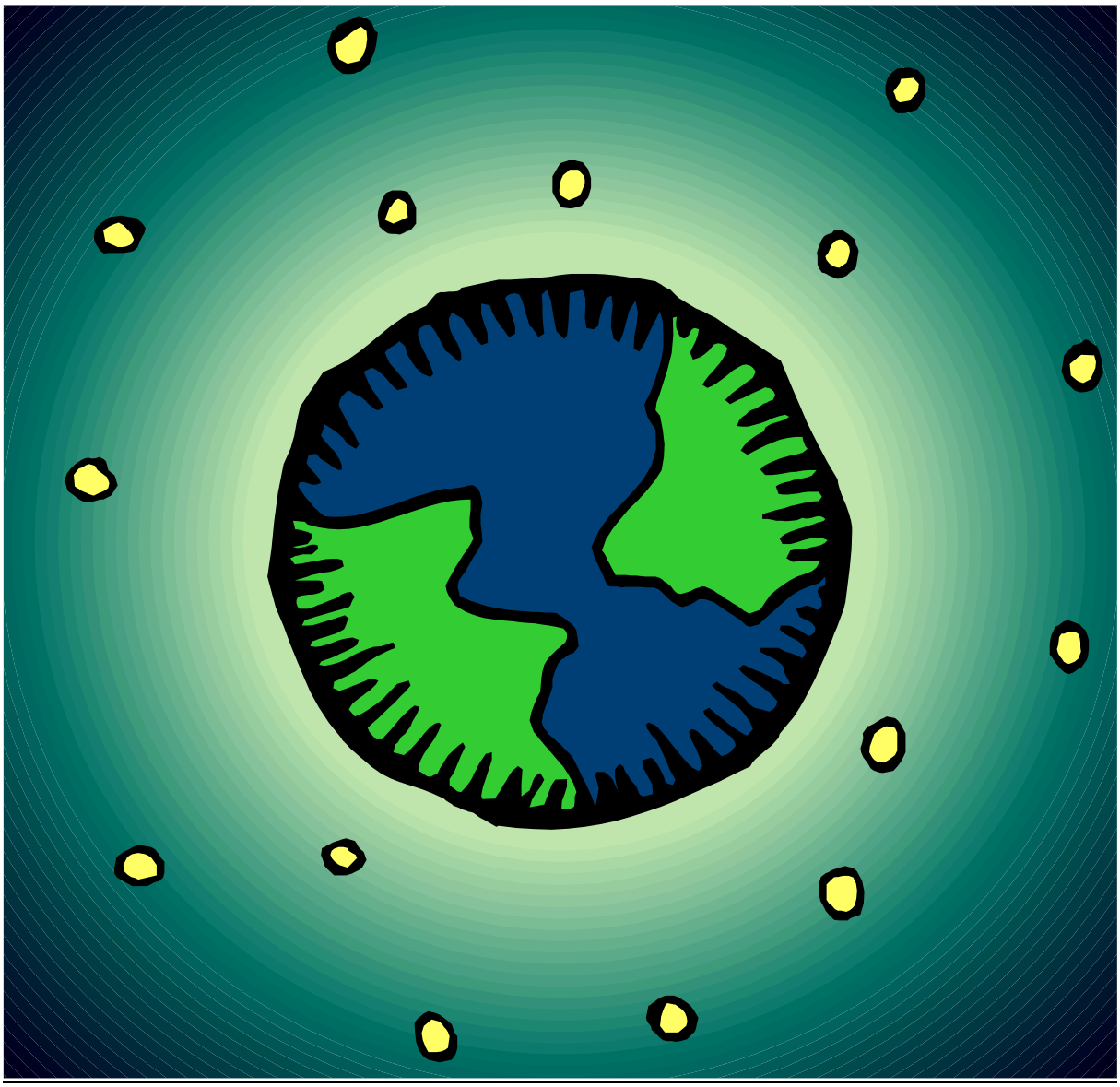
Questions regarding the Science Framework may be directed to:

Christopher Dowell, Consultant
Curriculum Frameworks Office
California Department of Education
721 Capitol Mall, Sixth Floor
Sacramento, CA 95814
(916) 657-5425
cdowell@cde.ca.gov

Tom Adams, Administrator
Curriculum Frameworks Office
California Department of Education
721 Capitol Mall, Sixth Floor
Sacramento, CA 95814
(916) 657-3617
tadams@cde.ca.gov

Greg Geeting, Assistant Executive Director
State Board of Education
721 Capitol Mall, Fifth Floor
Sacramento, CA 95814
(916) 657-5478
ggeeting@cde.ca.gov

Science Framework for California Public Schools
Kindergarten Through Grade Twelve



Adopted by the State Board of Education on February 6, 2002*
[*Subject to technical editing]

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On January 13, 1989, the State Board of Education adopted the following policy statement on the teaching of natural sciences, which was printed in the 1990 Science Framework for California Public Schools Kindergarten Through Grade Twelve. This policy statement supersedes the State Board's 1972 Antidogmatism Policy that was distributed statewide in 1981 and printed in the 1984 Science Framework Addendum. To this policy statement are appended standard scientific dictionary definitions of several scientific terms to emphasize their meanings in scientific contexts.

State Board of Education Policy on the Teaching of Natural Sciences

The domain of the natural sciences is the natural world. Science is limited by its tools - observable facts and testable hypotheses.

Discussions of any scientific fact, hypothesis, or theory related to the origins of the universe, the earth, and life (the how) are appropriate to the science curriculum. Discussions of divine creation, ultimate purposes, or ultimate causes (the why) are appropriate to the history-social science and English-language arts curricula.

Nothing in science or in any other field of knowledge shall be taught dogmatically. A dogma is a system of beliefs that is not subject to scientific test and refutation. Compelling belief is inconsistent with the goal of education; the goal is to encourage understanding.

To be fully informed citizens, students do not have to accept everything that is taught in the natural science curriculum, but they do have to understand the major strands of scientific thought, including its methods, facts, hypotheses, theories and laws.

A scientific fact is an understanding based on confirmable observations and is subject to test and rejection. A scientific hypothesis is an attempt to frame a question as a testable proposition. A scientific theory is a logical construct based on facts and hypotheses that organizes and explains a range of natural phenomena. Scientific theories are constantly subject to testing, modification, and refutation as new evidence and new ideas emerge. Because scientific theories have predictive capabilities, they essentially guide further investigations.

From time to time natural science teachers are asked to teach content that does to meet the criteria of scientific fact, hypothesis, and theory as these terms are used in natural science and defined in this policy. As a matter of principle, science teachers are professionally bound to limit their teaching to science and should resist pressure to do otherwise. Administrators should support teachers in this regard.

Philosophical and religious beliefs are based, at least in part, on faith and are not subject to scientific test and refutation. Such beliefs should be discussed in the social science and language arts curricula. The Board's position has been stated in the Board's adopted *History-Social Science Framework* (2001). If a student should raise a question in a natural science class that the teacher determines is outside the domain of science, the teacher should treat the question with respect. The teacher should explain why the question is outside the domain of natural science and encourage the student to discuss the question further with his or her family and clergy.

Neither the California nor the United States Constitution requires, in order to accommodate the religious views of those who object to certain material or activities that are presented in science classes, that time be given in the curriculum to those particular religious views. It may be unconstitutional to grant time for that reason.

Nothing in the California *Education Code* allows students (or their parents) to excuse class attendance based on disagreements with the curriculum, except as specified for certain topics dealing with reproductive biology and for laboratory dissection of animals. [See California *Education Code* sections

51550 and 32255.1 (Chapter 65, Statutes of 1988), respectively.] However, the United States Constitution guarantees the free exercise of religion, and local governing boards and districts are encouraged to develop statements like this one that recognize and respect that freedom in the teaching of science. Ultimately, students should be made aware of the difference between understanding, which is the goal of education, and subscribing to ideas, which is not.

From Academic Press *Dictionary of Science and Technology*, San Diego, CA.: Harcourt Brace Jovanovich © 1992.

Definitions

Law Science. a scientific principle that is invariable under certain stated conditions; for example, Boyle's law holds that the product of the pressure of a gas times the volume of the gas will remain constant if temperature remains constant.

Hypothesis Science. a theory or proposition that is based on certain assumptions and that can be evaluated scientifically.

Theory Science. an explanation for some phenomenon that is based on observation, experimentation, and reasoning.

Theory, hypothesis as terms in science mean a generalization reached by inference from observed particulars and proposed as an explanation of their cause, relations, or the like. **Theory** implies a larger body of tested evidence and a greater degree of probability… **Hypothesis** designates a merely tentative explanation of the data, advanced or adopted provisionally, often as the basis of a theory or as a guide to further observation or experiment…